

**COLORADO DEPARTMENT OF PUBLIC HEALTH and ENVIRONMENT  
ENVIRONMENTAL AGRICULTURE PROGRAM**

**SCENTOMETRY (ODOR CONCENTRATION MEASUREMENT) POLICY  
FOR  
HOUSED COMMERCIAL SWINE FEEDING OPERATIONS**



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**Colorado Department  
of Public Health  
and Environment**

**Environmental Agriculture Program  
and Air Pollution Control Division  
4300 Cherry Creek Drive South  
Denver, CO 80246**

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## **Introduction**

The Colorado Department of Public Health and Environment's (department) Environmental Agriculture Program (Ag Program) and Air Pollution Control Division (division) developed this policy to provide owners and operators of housed commercial swine feeding operations (HCSFOs) with testing, monitoring parameters and methods to demonstrate compliance with the odor standards that must be met at or beyond the property boundary as required by the Colorado Air Pollution Control Commission Regulation No. 2., Part B. The Ag Program intends for this policy to address all facets of odor concentration testing and monitoring at HCSFOs. Any questions concerning odor standard requirements should be directed to the Ag Program at (303) 692-2135.

## **Regulatory Requirement (Regulation No. 2, Part B, Section III.)**

Regulation No. 2, Part B, requires all HCSFOs to manage odor emissions from all aspects of the operations such that odor emissions from the operations shall not be detected at or beyond the property boundary after the odorous air has been diluted with seven (7) or more volumes of odor free air.

HCSFOs are also subject to an additional performance standard that odor emissions shall not be detected at any off-site receptor after the odorous air has been diluted with two (2) or more volumes of odor free air.

## **Producer Compliance Requirements and Protocol**

In order to determine compliance with the odor standard, the department requires a division odor school certified person to conduct bi-annual (two times per year) odor concentration testing. For each farm, odor concentration measurements shall be taken at three locations and shall be repeated at each location for a total of six odor measurements. The locations for the odor measurements are to include the following locations: downwind of the odor plume at the property line; at, or near, an off-property location upwind of the odor plume; and in the strongest odor plume within the property boundary (i.e., on the berm of the impoundment(s) or downwind of the barns).

An odor *reading* is defined as two measurements of odor concentration separated by at least 15 minutes but no longer than 60 minutes at each of the three locations. Both measurements at or beyond the property line must be 7:1 to be considered a reportable violation of the property line odor standard. If a violation of the 7:1 standard is obtained the producer must report the violation to the Ag Program and the local health department within two hours. A phone message or an email is considered adequate notification, if the inspector cannot be reached in person.

## **Monitoring Frequency**

Odor observation readings must be taken at two times each year with one test taken during the months of March/April and one test taken during the months of June/July.

## **Sampling Method**

The person conducting the odor concentration readings in addition to being certified by

the division must follow the division's scentometer protocol provided below. Measurements shall be taken with a properly calibrated and maintained scentometer or Nasal Ranger®. The scentometer and Nasal Ranger® are the only approved devices for measuring odor concentrations at HCSFOs currently available.

The locations for HCSFO compliance testing are as follows:

- At the closest property line downwind of the strongest odor plume at the operation;
- At, or near, the property line upwind of the production facility; and,
- Downwind of the strongest source of odor at each production facility within the property boundary (i.e., downwind of the barns or at the berm of an impoundment).

When sampling at these locations, two measurements must be taken for a total of six (6) measurements using a division-approved device (scentometer or Nasal Ranger®). If an odor reading is 7:1 or higher at or off the property downwind of the odor plume, the HCSFO must report the violation to the Ag Program and the local health department within two hours.

If the wind shifts more than 30 degrees during the sample period, sampling for that test must be suspended. The person conducting the odor measurements must then move into the middle of the odor plume corresponding to the new direction and begin the series of odor measurements from the beginning to obtain six measurements following the required time periods.

### **Recordkeeping and Reporting Requirements**

The odor concentration observed by the certified odor evaluator should be recorded on a field report, including all supporting documentation such as time of test, date, weather conditions, temperature, wind direction, wind speed and legible maps indicating the location of each reading, the HCSFO property line (or boundary of odor easements) and a legend that accurately identifies north. All field records should be summarized in a table and included in the semi-annual or annual report with the labeled maps. In addition, a copy of the odor evaluator's annual odor certification form, as provided by the division, must be included in the reports. A copy of the latest calibration certification for the scentometer or Nasal Ranger® should be retained for availability upon request.

### **Scentometer Protocol (as provided in the division's odor school)**

The odor observation procedures 3 through 9 should be followed when using a division-approved Scentometer or Nasal Ranger® while conducting odor observation readings at Colorado HCSFOs:

1. Locate source of odor using triangulation if needed.
2. Locate the odor plume downwind and off-property of the source of odor origination.
3. Insert scentometer into nostrils, making sure of leak-tight fit.
4. Leak check the fit by attempting to inhale with all inlets (both odor and odor-free) closed.

5. Open odor-free ports (leaving odor inlets closed) for a period of time long enough so no odor sensation is noted. This will refresh the nasal cavity.
6. Start the odor observation by opening the smallest (largest dilution) odor inlet and determine if an odor sensation is noted at that dilution. Hold the scentometer at a 90° angle to the wind. If no odor sensation is noted, move on to the next larger inlet.
7. Record the dilution-to-threshold ratio (D/L) of that odor inlet when an odor response is first detected (highest dilution). Also record the time and wind direction.
8. Close the odor inlets and breathe through the scentometer for a long enough period of time so that no odor sensation is observed.
9. Close all ports and again document a leak-tight fit.
10. Move to an upwind (off-property) location and document time, wind direction, and that no odor is observed.
11. Return to the downwind location and repeat steps 1-9.

The division requires annual certification for HCSFO or health department personnel taking official odor observations at the property line. The division administers odor school certification courses throughout the year. Classes are on a first come basis with a maximum of 20 slots available. There is a fee for the class. For the division's upcoming class schedule(s) and current fee information, contact Roy Doyle at: (303) 692-3159.

#### **Local Health Inspector and Department Inspection and Complaint Protocols**

Division odor school certified local health inspectors and department staff are the only people that can validate an odor violation as a result of an odor complaint. The validation process for an odor complaint is as follows:

- The local/state inspector determines the source of odor and takes an odor measurement following the division scentometer protocol (using triangulation to determine the source of odor) as described below.
- If an odor measurement of 7:1 or stronger (15:1, 31:1) occurs at or beyond the property line, then a second odor measurement separated by at least 15 minutes, but no longer than 60 minutes, is required to validate the odor violation.
- If the second odor measurement is below 7:1, the HCSFO is not considered to be in violation of the property line standard.
- If the second odor measurement is at or above 7:1, a violation of the property line standard has been validated.

See the Ag Program's Odor Complaint Policy for additional information at:

<http://www.cdphe.state.co.us/oeis/eap/eapdocs/odorpolicy.pdf>